



Seismic triggering process on small sized faults: Southern Betic Cordillera (Spain)

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Most of seismic triggering studies are focused on the effects produced by moderate-to-large earthquakes ($M > 5.5$). However, small-to-moderate earthquakes are also able to produce crustal stress changes and triggering in neighbouring faults. Furthermore, in moderate activity regions small-to-moderate earthquakes very often represent the major contribution to seismic hazard at short-to-medium return periods ($RP < 5000$ -year), as it has been shown in a recent seismic hazard assessment of Southeast Spain. The southern Betic Cordillera exhibits a high density of small faults ($L < 20$ km), active since Late Miocene to the present, and a high seismicity rate of small and moderate earthquakes ($M < 5.5$). Both facts make this region very adequate for the study of seismic interactions among small faults. Since 1980 three significant seismic series have taken place within a small area (50 km^2) of Almería Province: Sierra Alhamilla 1984, m_{bLg} 5.1; Adra 1993-1994 m_{bLg} 5.0; and SW of Adra 1997, m_{bLg} 4.4. The focal mechanisms of the mainshocks show dissimilar orientation and kinematics (oblique-slip faulting, reverse faulting and normal faulting, respectively). A statistical analysis of the spatial and temporal distribution of all earthquakes occurred since 1985 in a region centred at the epicentre of the Adra 1993 mainshock has been carried out. Results show the occurrence of 5 series and 20 sub-series of earthquakes produced by several episodes of fault reactivation. The models of Coulomb failure stress transfer also supports the existence of seismic interactions between neighbouring faults, suggesting that the spatial and temporal occurrence of small-to-moderate earthquakes in this part of the Betic Cordillera is strongly controlled by minor faults interactions.